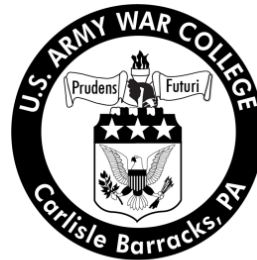


Strategy Research Project

The Strategic Importance of Defeating Underground Facilities

by

Lieutenant Colonel Craig Baker
United States Air Force



United States Army War College
Class of 2012

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USAWC STRATEGY RESEARCH PROJECT

THE STRATEGIC IMPORTANCE OF DEFEATING UNDERGROUND FACILITIES

by

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America's potential adversaries have realized that current non-nuclear penetrating weapons are relatively ineffective in destroying underground facilities. According to the Director of the Defense Intelligence Agency, "the use of underground facilities...is expanding as potential adversaries conceal and protect their most vital national security functions and activities." As such, underground facilities likely constitute adversary centers of gravity. In fact, vital national security functions and activities describe strategic centers of gravity. Therefore, if resources allow, attacks on these centers of gravity may deal a decisive blow to the enemy. This paper will discuss adversary mindset changes in utilizing underground facilities; it will argue that successful targeting of these facilities may persuade the adversary to discontinue their efforts. It will also examine the most relevant ethical questions in directly targeting strategic leaders known to be hidden in such facilities. Finally, it will focus on specific challenges in defeating underground facilities. The conclusion argues that the strategic importance of underground facilities demands national-level attention to the practical and ethical questions relevant to successfully attacking and defeating them.

THE STRATEGIC IMPORTANCE OF DEFEATING UNDERGROUND FACILITIES

Their significance was felt beyond their walls; it contributed to the conquest or retention of the country, the successful or unsuccessful outcome of the whole struggle, and thus tended to give war itself greater coherence. In this way, fortresses attained a strategic significance that for a time was considered so important that they formed the basis of strategic plans, which were more concerned with capturing a few fortresses than with destroying the enemy's armies.¹

—Carl Von Clausewitz
On War

America's potential adversaries have realized that non-nuclear penetrating weapons are relatively ineffective in destroying underground facilities (UGFs).² Consequently, they use these facilities as a sanctuary from U.S. precision air strikes effectively to deny the U.S. its asymmetric military advantage in high-tech weaponry. According to Lieutenant General Ronald Burgess, the Director of the Defense Intelligence Agency (DIA) in a statement before the Committee on Armed Services, "the use of underground facilities...is expanding as potential adversaries conceal and protect their most vital national security functions and activities."³ National security functions and activities include but are not limited to Weapons of Mass Destruction (WMD), the means of delivering WMD, anti-access weapons, senior leadership, protection of critical terrorist assets and facilities, and command and control assets.⁴ Further contributing to the marked increase in UGF construction are advances in commercially available Western tunneling technology and lower construction costs. Recently, countries previously not invested in UGFs have begun actively using this technology to bury critical functions.⁵ Finally, potential adversaries are trying to neutralize U.S. asymmetric advantages in precision, long-range strike capabilities. They have proven the ability to build UGFs faster than America can develop new means of holding them at risk.⁶

Similarly, during the Second World War (WWII), the Germans built underground factories that were initially safe from inaccurate Allied non-penetrating weapons.⁷ The Germans wisely attempted to protect valuable industry such as transportation, oil, power, and chemical production, but their efforts failed in placing a substantial percentage of these activities underground. Instead, Allied attacks on above-ground military industrial infrastructure targets dealt a decisive blow even though the German fighting forces command, control, coordination, and communication networks continued to operate. Eventually, the persistence of the Allied air offensive would lead to the decline and collapse of the German economy, certainly a factor leading to the end of WWII in Europe.⁸ Even though few countries at the time took advantage of UGFs, today their continuing evolution has provided increasing levels of protection for adversary national security functions and activities, minimized the asymmetric advantage to the U.S., and made possible the hiding of WMD.

As a result, many adversary countries are investing in UGFs. In fact, more than 70 countries have underground facilities, and the number of strategic UGFs continues to increase.⁹ General Burgess mentioned a few in his statement before the Committee on Armed Services. Iran's extensive program to protect its nuclear infrastructure relies upon buried and hardened facilities and improved air defenses.¹⁰ North Korea uses UGFs to protect important parts of their nuclear program.¹¹ Crucial parts of Syria's WMD, chemical, and biological programs are protected underground.¹² China, considered a world frontrunner in UGF technology, is placing more of its military personnel and activities, facilities, and key strategic leadership underground.¹³ Russia, always known for its massive and deep underground facilities, is in the middle of

upgrading underground facilities responsible for housing its central command and control and strategic nuclear forces.¹⁴ Pakistan protects its nuclear weapons as well as vital parts of its nuclear program underground.¹⁵ However, UGF use and technology are not limited to states. Non-state actors have also gone underground.

Non-state actors have successfully evaded and attacked superior forces using UGFs. In 2006, Hezbollah complicated Israeli targeting by effective use of UGFs to store weapons, hide key leadership, and launch lethal rocket attacks.¹⁶ Additionally, prominent members of Al Qaida, the Taliban, and the Haqqani network, located in Afghanistan and Pakistan, use extensive tunnel and cave systems to protect their leadership and extremist activities.¹⁷ Their successes highlight limitations in many Intelligence, Surveillance, and Reconnaissance (ISR) platforms, problems in multi-sensor integration, and ISR capabilities to characterize and assess UGFs. In fact, the combination of non-state actors and UGFs may allow them to acquire and use WMD. The Center for the Study of WMD concluded, "If a rogue leader believes he enjoys physical sanctuary in an underground bunker, he will be less inclined toward restraint when contemplating the use of WMD."¹⁸ Therefore, UGFs have inherent value to state and non-state actors not only by protecting their critical security functions and activities, but by frustrating several U.S. and Allied strategic objectives.

The adversary, in choosing to deliberately harden a facility or drill a tunnel, has made a conscience decision that the protected technology, activity, and/or leader are significantly important to their warfighting capabilities and political ends. Hence, UGFs can quickly change the nature and result of a conflict. Adversaries with effective UGFs can prolong conflicts, reduce U.S. asymmetric advantages, and inflict damage on the

U.S. and Allied forces. For this reason, UGFs likely represent an adversary center of gravity (COG). Joint Publication (JP) 5-0 defines COG as “a source of power that provides moral or physical strength, freedom of action, or will to act.”¹⁹ Carl Von Clausewitz, in describing defeat of the enemy, defines a COG as “The hub of all power and movement, on which everything depends. That is the point against which all our energies should be directed.”²⁰ Clausewitz deemed fortresses a strategic COG in the eighteenth century. He implied that defeating fortresses was more significant than destroying enemy armies. John A. Warden III, a 20th Century theorist, further explained that a COG “describes that point where an adversary is most vulnerable and the point where an attack will have the best chance of being decisive.”²¹

Strategic COGs include vital national security functions, an alliance, political or military leadership, and national will.²² Therefore, if resources allow, attacks on these centers of gravity may deal a decisive blow to the enemy.²³ Some strategists hypothesize that a successful decapitation strike at the beginning of Operation Iraqi Freedom (OIF) would have ended the conflict before it began. In this case, the decapitation strike had very strategic implications. The foundation of the aforementioned example was the strategic leader; Saddam Hussein was the strategic COG. Many of Saddam’s safe houses were UGF’s including Dora Farms, a compound near Baghdad which was attacked in early 2003.²⁴ As a result, defeating these UGFs have strategic implications, and are recognized as such in various military strategies.

The Quadrennial Defense Review (QDR), National Military Strategy to Combat Weapons of Mass Destruction (NMS-CWMD), and the Air Force Chief of Staff (CSAF) Vector 2011 highlight UGFs as part of the military strategy. The QDR, a review

mandated by Congress every four years, speaks to enhancing capabilities for domain awareness by directly tasking the Department of Defense (DoD) and its interagency partners to “comprehensively monitor the air, land, maritime, space and cyber domains for potential direct threats to the United States”²⁵ As such, DoD is working with the Department of Homeland Security (DHS) and the DIA “through a joint technology capability demonstration program to explore new technologies to assist in the detection of tunnels.”²⁶ The NMS-CWMD recognizes that the 21st century WMD security environment includes UGFs and subsequently lists a number of challenges in global proliferation activities including “...underground Chemical, Biological, Radiological, and Nuclear (CBRN), and missile-related facilities...”²⁷ The NMS-CWMD discusses military mission areas, specifically offensive operations as required to deter or defeat a WMD threat located in hard and deeply buried targets.²⁸

Further, a key component to U.S. military strategy is to produce desired effects across the battlespace and across target sets. In the CSAF’s Vector 2011, he mentions four unique contributions that define the U.S. Air Force (USAF), one being to hold any target at risk. Specifically, he says that “the Air Force possesses unique abilities to achieve precise lethal and non-lethal effects that shape the strategic behavior of others, often at long range and in heavily opposed environments.”²⁹

It should be clear the shift in adversary mindset involves moving critical national security functions and leadership underground. These UGFs provide a sanctuary for state and non-state actors against U.S. and allied precision weapons, and reduce the West asymmetric advantage. They can represent an adversary strategic COG in that successful targeting may mean enemy capitulation. Now, the paper will examine two

historical events (German U-boat campaign in WWII and the OIF decapitation strike) to reveal that targeting the involved UGFs may largely contribute to halting the conflict or compel an adversary to surrender before the conflict even starts. Next, the paper will explore the most relevant ethical questions in targeting strategic political or military leaders. Finally, the paper will focus on specific challenges in defeating underground facilities. The conclusion argues that the strategic importance of underground facilities demands national-level attention to the practical and ethical questions relevant to successfully attacking and defeating them.

German U-boat Campaign in World War II

The WWII struggle of Nazi Germany against the Allied spur into the European continent was mainly decided along the trade routes of the North Atlantic. The contest turned out to be the deadliest naval conflict in history, Allied merchant ships carrying tons of precious supplies versus the “wolf packs” of German U-boats, Hitler’s most destructive weapon.³⁰ For the Allies, the battle meant the loss of 2,653 merchant vessels, 175 warships, 14.6 tons of shipping, and over 71,000 merchant seamen, naval gunners, and civilian passengers. German losses totaled 717 of its 830 U-boats and 27,490 sailors (over a 70% fatality rate).³¹ The losses were extreme because the European Allied strategic COG was the prize for Germany.

The European Allied strategic COG was the supply chain from the U.S., sustaining Great Britain despite an already failing economy. Therefore, critical capabilities, requirements, and vulnerabilities included strategic mobility from the continental U.S. and the sea lines of communication. British Admiral Sir Max Horton had written “Control of the sea is vital to the British Empire, if we lose it, we lose the war.”³² Similarly, Grossadmiral Karl Donitz, Commander-in-Chief of both the German Navy and

of the U-boat Force, stated “As long as their island home and their vital sea lines of communications were not in mortal danger, the British would see no reason to end the war.”³³ Britain’s economy had been ground to nothing during their lengthy battle with Germany. By mid-July 1940, the Royal Navy had only a two-month supply of oil remaining.³⁴ As a result, Britain was almost entirely dependent on supplies being rushed in by the U.S. ships. Without Britain, the Allies could not launch an amphibious invasion of the European continent.³⁵ Thus, if the U-boats managed to sever the lifeline between the U.S. and Great Britain, Germany would thwart the Allied invasion, strangle the British economy, and force the United Kingdom out of the war. In this case, there would be no Western front, and hence, it was possible that Stalin might have offered Germany a deal on the Eastern Front, giving Hitler the lands occupied by his military forces.³⁶

If the Allies could supply the British war effort for long enough to assemble an invading force in the British Isles, they could carry the fight onto the European continent and, eventually, to Germany. By the spring of 1943, Ed Offley explains in *Turning the Tide*, “the stakes in the Battle of the Atlantic were the same as the overall Allied grand strategy against the Nazis; victory or defeat.”³⁷ After WWII, Prime Minister Winston Churchill said, “The only thing that frightened me during the war was the U-boat menace.”³⁸ During WWI, Churchill witnessed a small German submarine force cripple England and he did not want a repeat performance in WWII.³⁹ In the end, the U-boats suffered great defeat, thus saving the British war effort and enabling the invasion of fortress Europe.

Of the five U-boat bases on the French Atlantic coast [Lorient, Brest, St. Nazaire, La Rochelle, and Bordeaux], Lorient and St. Nazaire became operational first in mid-

1940 and created a geographical advantage for Donitz. From Lorient and St. Nazaire, the U-boats traveled 450 miles less than the bases in the Baltic to the main Allied shipping lanes in the Atlantic producing an immediate increase in Allied ships sunk.⁴⁰ In fact, by September 1941, 25 percent of the whole British Fleet had been lost.⁴¹ And, by the end of 1941, the U-boats from Lorient and St. Nazaire sank 445 ships and over 40 percent of the total shipping tonnage during the entire U-boat campaign for the price of less than 10 U-boats.⁴² Because of these statistics, Hitler knew that the U-boat bases would become a primary target for the Allies. Therefore, he hired a German construction company to heavily fortify the bases by constructing bunkers with thick concrete roofs, able to withstand a direct hit from Allied bombers and big enough to hold multiple U-boats. One of the pilots from the VIII Bomber Command recounted that “from four miles up, these shelters resembled cardboard shoeboxes,”⁴³ but at the ground level they were massive bunkers protected from direct bomb hits by a 12 foot thick reinforced concrete roof and from bomb blast by 8 foot thick reinforced concrete walls. Unfortunately, the bombers were hitting the bunkers, but a single bomb could not destroy, let alone penetrate or degrade the shelters.⁴⁴ The invulnerability of the U-boat bases frustrated the Allies mainly because one-third of the U-boat force were at the bases at any given time for needed repairs, maintenance, fuel, and supplies.⁴⁵ By 1941, Britain’s imports decreased by one-third meaning that the country could run out of food in as little as four months if the U-boats continued to succeed.⁴⁶ As a result, the Allies decided to relentlessly bomb the U-boat bases—Hitler’s primary means of shutting off Allied supply lines.

In 1942, the Allies gave top priority to the war against the German U-boats. In a directive issued on October 20, 1942, the Allied Commander-in-Chief, General Dwight D. Eisenhower, made the U-boat bunkers and production facilities first and second priority, respectively. From October 1942 through July 1943, the Allies bombed the U-boat bases in France with little effect.⁴⁷ The U.S. bombed during the day and the British at night.⁴⁸ The Royal Air Force dropped 146 tons of bombs on the Lorient bunkers with little to no damage.⁴⁹ Even the final Army Air Forces (AAF) raid by 158 heavy bombers against the St. Nazaire sub pens on June 28, 1943, failed to yield significant results.⁵⁰ A total of 177 bombardments of St. Nazaire occurred during 1940-1943 and still the bunkers remained untouched and in perfect working condition.⁵¹ Regrettably, destroying nearby structures around the bunkers had little effect on the enemy's ability to refit operational U-boats.⁵²

However, Black May, May 24, 1943, was the turning point in the Battle of the Atlantic. Allied technology finally caught up with Germany's asymmetric advantage. Behind the Allied success were three technological innovations: radar—a means of detecting and defeating the wolf packs before they got to lethal ranges; high-frequency direction finding—allowed warships an exact line of bearing to a U-boat when it sent an encrypted radio message; and Talk Between Ships—a radiotelephone system that enabled escort ship commanders to coordinate their movements faster and more effectively than before.⁵³ In May 1943, 41 U-boats were lost in the Atlantic,⁵⁴ more than any other time period, and on Monday, May 24, 1943, Donitz finally gave up. Recognizing that he had a problem in the North Atlantic, Donitz ordered all remaining North Atlantic U-boats to areas less frequented by enemy aircraft patrols. This would

protect the remaining U-boats and buy time until German scientists and weapons developers could develop countermeasures to Allied land-based aircraft and radar.⁵⁵

The North Atlantic had now become a killing field for the U-boats by the Allied convoy escort groups, long range bombers, and navy fighters. Donitz's U-boats retreated from the North Atlantic for several months, and concentrated on the route between Virginia and Gibraltar as opposed to total control of the North Atlantic. The U-boats would eventually return to the North Atlantic, but would never succeed in preventing an Allied invasion of Europe.⁵⁶ In Donitz's post-war memoirs, he wrote, "finally accepted what had happened out in the storm-tossed ocean between mid-March and late May 1943: We had lost the Battle of the Atlantic."⁵⁷

The U-boat bases represented a critical strength of Germany's strategy of cutting the lifeline between the U.S. and Great Britain; the U-boats at sea became Germany's critical vulnerability. Neutralizing the U-boat bunkers would have significantly lessened the advantage of the U-boats in being so near where the crucial supplies were being shipped to Europe for the invasion.⁵⁸ Further, success against the U-boat bases would have meant a decrease in the production rate for U-boats, reduction in the number of U-boats at sea, and disruption of the refitting of operational U-boats.⁵⁹ Donitz calculated that he needed a fleet of 300 U-boats to close the Atlantic.⁶⁰ Fortunately for the Allies, the most he had at any one time was 250, with one-third of those at the French bases, and 118 at sea.⁶¹ If the U-boat base bunkers would have been successfully penetrated by the Allies, Donitz would have lost over 80 U-Boats and the capability for needed repairs, maintenance, fuel, and supplies on the French coast. Additionally, bunker destruction meant a significantly reduced U-boat production rate and overall numbers at

sea. With the loss of the U-boat bunkers, the remaining U-boats would be pushed to sea and subject to destruction based on the Allied technological improvements. In this case, if Donitz decided to continue the North Atlantic U-boat battle, he would have been forced to use the unprotected Baltic bases at a much greater distance to the North Atlantic. This would have meant a reduction Allied shipping losses to pre-1940 numbers and loss of the capability to reach the Gibraltar routes and American coastline. Without the French U-boat bases, there was no way to prevent the Allied invasion of Europe.⁶²

This historical example proves the strategic importance of the U-boat bunkers. The hypothetical result of the U-boat bunkers being a vulnerability (that the Allies could have exploited) and not a strength would have been reduced damage to Britain's economy and a shift in Hitler's strategy away from using the North Atlantic as his primary point of attack against Allied supply lines. The bunkers later became vulnerable, but not until mid 1944 when the Allies developed the Tallboy weapon. By this point, Hitler had already lost the Battle of the North Atlantic. In retrospect, national-level strategies should have placed a higher priority on the bunkers—with 'effective' weapons and targeting—prior to 1942.

OIF Decapitation Strike

A more recent historical example reveals that military leaders may be a strategic COG and specifically, that without Saddam Hussein, Iraqi forces may not have entered into the conflict and the later insurgency may never have begun. Both the George H.W. Bush and Bill Clinton Presidential administrations promoted policies to leave Saddam in power instead of launching a large-scale invasion. Similar to the U.S Cold War policy with the Soviet Union, both H.W. Bush and Clinton thought they could contain and potentially overthrow Saddam without much U.S. involvement and also maintain Arab

support.⁶³ Even the United Nations (UN) sanctions and limited air strikes in the mid-1990s were aimed to put pressure on the Iraqi military to overthrow Saddam. However, containment and air strikes were not successful; the Iraqi dictator continued in power while preventing UN weapons inspectors from confirming compliance with Security Council resolutions.⁶⁴

Then the terrorist attacks on 9/11 changed America's strategic context with respect to Iraq and Saddam.⁶⁵ After 9/11, the Bush administration reassessed the strategy of leaving him in power. The President concluded that "Hussein would never comply with the 1991 settlement, that the threat Iraq posed was growing, and that containment and limited force would neither compel compliance nor inspire the Iraqi military to overthrow the dictator."⁶⁶ Further, the intelligence under the Bush administration perceived WMD in Iraq and believed Saddam had worked with Al Qaeda.⁶⁷ Moreover, the Bush administration had both facts and assumptions for removing Saddam. The facts were that Saddam had for a decade failed to demonstrate that he had complied with the UN resolutions to destroy his WMD stockpiles and had mislead UN efforts to verify compliance. He had a history of aggression and intimidation with respect to neighboring states.⁶⁸ The assumptions were, therefore, that "Hussein's refusal to verify compliance with UN resolutions and obstruction of weapons inspectors attempting to verify his compliance indicated that he had not complied."⁶⁹ Also, administration officials believed "if the sanctions were lifted, Hussein would resuscitate his WMD and missile programs."⁷⁰ The American security posture precluded waiting for another terrorist attack before acting; America could not accept the risk of terrorists using WMD. The so-called Bush Doctrine held that threats must be addressed before

they mature and the administration argued that Saddam had demonstrated the ability to obtain WMD and might give them to terrorists for use against the U.S.⁷¹

Outside the Bush administration, “conservative writers and former policymakers” either wanted Saddam removed from power, linked 9/11 and WMD, or postulated a connection between him and Al Qaeda. William Kristol, the former Reagan official, now editor of *The Weekly Standard*, argued in favor of removing Saddam by force. Laurie Mylroie, a Harvard Ph.D., in her book *Study of Revenge: Saddam Hussein’s Unfinished War Against America*, linked Saddam’s regime with the 1993 World Trade Center bombings.⁷² Former Central Intelligence Agency (CIA) director James Woolsey wrote that Iraq may have been involved in the 9/11 attacks.⁷³ Richard Perle, head of Rumsfeld’s Defense Policy Board, concluded that winning the war on terrorism was not possible while Saddam still ruled Iraq.⁷⁴ Charles Krauthammer, a conservative commentator, argued that Iraq should be “stage three” (following Afghanistan and Syria) of the war on terrorism. Conservative icon William Buckley talked about the relationship between Saddam and bin Laden.⁷⁵ Finally, talk show radio hosts like Rush Limbaugh frequently voiced the need to remove Saddam from power.⁷⁶

In line with much of this public commentary, but ignoring a few prominent government and military professionals—including uniformed military advisors, State Department Foreign Service experts, and a few contrary voices in the intelligence community—the Bush administration decided for several reasons that Saddam and his regime needed to go. In a radio address, President Bush announced his belief that Saddam “provides funding and training, and safe haven to terrorists who would willingly deliver weapons of mass destruction against America and other peace-loving

countries.”⁷⁷ In remarks to the American Enterprise, the president insisted that Saddam with WMD could “dominate the Middle East and intimidate the civilized world.”⁷⁸

Moreover, the administration believed that Iraq, because of its large middle class and natural resources, would be the best test for democratization and market-based economic reform in the Middle East.⁷⁹ As a result, the immediate goal, as stated by the Bush administration, was to remove Saddam Hussein’s regime, including its ability to use weapons of mass destruction or to make them available to terrorists.⁸⁰ At first, the strategy considered covertly removing the regime. However, according to former CIA Director, George Tenet, “Our analysis concluded that Saddam was too deeply entrenched and had too many layers of security around him for there to be an easy way to remove him.”⁸¹ Therefore, the decision to remove Saddam and his regime became an overt plan, through force and the U.S. military. The terrorist attacks on 9/11 provided a rationale and a window of opportunity to execute this plan.

The OIF Operations Plan (OPLAN) considered a decapitation approach—killing Saddam and his sons as a way to improve the calculus and possibly bring about a negotiated settlement as an alternative to waging a full campaign.⁸² The approach was simple: kill the strategic COG and avoid a larger scale conflict. An opportunity seemed to present itself just prior to the expiration of the 48-hour ultimatum given to Saddam by President Bush at 8:00 pm EST on March 17, 2003.⁸³ The CIA was “99.9 percent” sure they had located Saddam and his two sons; they had tracked them to a meeting at Dora Farms, a compound outside Baghdad that had been a frequent hangout for Saddam and his family. President Bush decided to accelerate actions to execute this strike in

hopes success would force a shortened military campaign or at least hinder command and control in the Iraqi military.⁸⁴

The mission called for Navy cruise missiles, located in the Persian Gulf, to level all the buildings in the compound. However, late breaking intelligence imagery suggested the presence of an additional target, a UGF—an underground sanctuary command post for Saddam and his sons.⁸⁵ This UGF could not be destroyed with cruise missiles; it would have to be destroyed by bunker-busting bombs. Since the F-117 had already arrived in theater, and carried the newest of these bunker busting bombs, it seemed the best option to carry out the short-notice attack.⁸⁶ If this combination attack of cruise missiles from the Navy and bunker buster bombs from the F-117's proved successful, killing Saddam and his sons, then U.S. Central Command might “end the war with one blow before it had really begun.”⁸⁷

In the end, the mission to get missiles and bombs on Dora Farms at the expiration of the ultimatum was a success, but it failed to kill Saddam or his sons. Human and imagery intelligence for this strike was not accurate; not only were Saddam and his sons not at the site that night,⁸⁸ but there was no UGF.⁸⁹ Saddam and his sons would eventually be killed, but long after the military campaign took the country. The point of this example was to show the difficulty of targeting leadership and to discuss the possible advantages of “decapitating” enemy regimes held together by force or a cult of personality; Saddam Hussein was the strategic COG. Questions linger, though, about the legality of targeting specific leaders within an enemy regime. How might the difference be defined between attacking a legitimate military target and political assassination?

Killing Strategic Leadership

In many cases, leadership constitutes a strategic COG. However, should strategic leaders⁹⁰ be targeted and killed, a process described as ‘targeted killing’?⁹¹ This section will very briefly consider killing strategic leaders during ‘approved’⁹² armed conflicts; who should be targeted and who should not? But, mostly this section argues which authority and law(s) allow targeting persons who are terrorists.

If a state satisfies the international approval process for waging war, *jus ad bellum*, and follows the laws of warfare, *jus in bello*,⁹³ killing uniformed combatants is permitted; and, in fact, soldiers in armed conflict have immunity for warlike acts and are not constrained from applying a range of lawful weapons against the enemy.⁹⁴ If a state is engaged in approved conflict, killing military individuals is permitted in most cases. Further, any military strategic leader is a legitimate target. Conversely, with political leadership, it is necessary to distinguish between politicians serving in the armed forces from those who are not. Heads of state serving in the armed forces or acting as Commander-in-Chief of the armed forces or serving in the military chain of command may be targeted, e.g. Saddam Hussein, President Obama, and the U.S. Secretary of Defense respectively. On the other hand, those heads of state not associated with the military or in any chain of command (Queen of England) are not considered a valid target. Finally, any civilian leader not associated with the military, but present at a military installation or in a Government office (that is a legitimate military target) may be targeted.⁹⁵

However, if a state is not engaged in approved conflict, then killing a strategic leader may resemble an assassination—prohibited by Executive Order 12333 signed by President Reagan in 1981.⁹⁶ In this case, lethal force is governed and limited by both

domestic law and international legal norms. Further, the use of force by the state must be necessary; taking a life in peacetime is only justified “when lesser means for reducing the threat [would be] ineffective.”⁹⁷

Before the 9/11 attacks, the U.S. treated terrorists as suspected criminals in accordance with the Law Enforcement paradigm, meaning in accordance with a preference not to use lethal force, but instead to arrest and try the terrorist.⁹⁸ Under this paradigm, “a country cannot target any individual in its own territory unless there is no other way to avert a great danger,”⁹⁹ presuming that “intentional killing by the state is unlawful unless it is necessary for self-defense or defense of others.”¹⁰⁰ Only the person’s behavior at the time of the threat allows the state to react with lethal force. Unfortunately, most terrorists work outside the state and therefore cannot be arrested.¹⁰¹ Compounding the problem, terrorists hide in failing or failed states where law enforcement does not exist or is ineffective.¹⁰²

After 9/11 the U.S. reassessed the Law Enforcement paradigm. Specifically, Congress gave the President the Authorization for the Use of Military Force (AUMF) against

...those nations, organizations, or persons he determines planned, authorized, committed, or aided the terrorist attacks that occurred on September 11, 2001, or harbored such organizations or persons, in order to prevent any future acts of international terrorism against the United States by such nations, organizations or persons.¹⁰³

This authorization provided the legal justification to use force against Al Qaeda and its associated organizations citing self-defense and the law of war.¹⁰⁴ Since the Law Enforcement paradigm does not apply in war, designated terrorists may be targeted and killed “because of their *status* as enemy belligerents.” Additionally, “the law of war

requires neither a certain conduct nor analysis of the reasonable amount of force to engage belligerents.”¹⁰⁵

An additional problem is the U.S. encroachment on a sovereign state that is not engaged in armed conflict with the U.S., but is providing a sanctuary for that terrorist or organization. Since the U.S. has been engaged in armed conflict in Afghanistan, this has not been an issue. However, what about other states? In these cases, the Obama administration argues that the U.S. “legal justification for targeted killings outside a current zone of armed conflict is anticipatory self-defense.”¹⁰⁶ The right to self-defense is explained in Article 51 of the UN charter.¹⁰⁷ Further, the right to anticipatory self-defense is “part of the U.S. interpretation of customary international law stemming from the *Carolina* case in 1837.”¹⁰⁸

The previous scenario highlights two potential issues with no clear solutions. First, which branch of government, legislative or executive, may legally invoke anticipatory self-defense? Unfortunately, there is no guidance from Congress to the President. In fact, there has never been any legislation from Congress on targeted killings or assassinations.¹⁰⁹ The self-defense trigger has been applied ad hoc, implying that this national-security decision remains within the president’s portfolio. Second, a soldier killing the enemy in armed conflict has immunity, but with anticipatory self-defense and no law-of-war rules, the right to kill remains unclear. Congress could answer this question by enacting law which clearly defines these rights or prohibitions. Otherwise, the weakness of the rationale presented in this section is that it is not coded in U.S. law and as such has no defensible legal basis.¹¹⁰

In the end, most believe targeting and killing Osama Bin Laden in Pakistan was legal. Even though the U.S. was not engaged in armed conflict with Pakistan, President Obama exercised the right of anticipatory self-defense and the law of war particularly using the AUMF. Al Qaeda's threat remains imminent and the use of force was legitimate. Forces made no attempt to arrest Osama Bin Laden during the raid because they anticipated a high military and civilian casualty rate if they were to attempt a live capture. Further, although frustrated, Pakistan granted the U.S. the authority to attack terrorists in their country given prior knowledge of the operations.¹¹¹ Although Osama Bin Laden has been dead for many months now, it remains to be seen if he acted as Al Qaeda's true strategic COG. U.S. intelligence officials say that Al Qaeda has been badly degraded. James R. Clapper, Jr., Director of National Intelligence, in recent congressional testimony commented about bin Laden's death, "That blow, combined with the toll taken by subsequent strikes and raids, has destroyed al-Qaeda's core."¹¹² If the pressure on al-Qaeda can be maintained, "there is a better-than-even chance that decentralization will lead to fragmentation."¹¹³

However, the looming problem, desperately needing a solution, remains. Authorizing the President to order targeted killing outside of armed conflict without Congressional limits may mean a continued manipulation of force, claiming the rationale of national security implications but without the foundation of law advanced in accordance with international norms. U.S. decision makers need such a law. In its absence, nothing stands in the way of enemies who might apply the same rationale. Simply asked, what otherwise prevents the "axis of evil" states from doing the same?

Today, the U.S. justifications are relatively simple. During ‘approved’ conflict, some strategic leaders are targetable and some are not. The problem is outside of ‘approved’ conflict. In this environment, the U.S. policy is one of targeted killing specifically aimed at terrorists. Unfortunately, the challenge may not be in the actual killing of that strategic leader, but in defeating that Hard and Deeply Buried Target (HDBT) providing sanctuary to that strategic leader.

Challenges in Defeating HDBTs

The significantly increasing number of HDBTs reduces the effective bandwidth of airpower, meaning HDBTs generally require more weapons and sorties per target to achieve the desired effects. Uncertainties in the number of targets, characterization of targets, target mission area locations, and weapons guidance will greatly increase the number of weapons and sorties per target.¹¹⁴ Further, smaller aim points combined with effective Global Positioning System (GPS) jamming¹¹⁵ may drive the numbers of weapons and sorties up exponentially. Finally, the improving strategic use of HDBTs and advances in their protective materials, design, and concealment will continue to diminish the effectiveness of U.S. countermeasures and military options to hold adversarial assets at risk. These challenges are fundamental realities inherent to the HDBT problem.¹¹⁶

Significant capabilities are emerging across the spectrum of HDBTs that could, over time, reduce U.S. asymmetric advantages with respect to potential adversaries fielding underground facilities. Factors including reduced construction costs, commercial availability of advanced tunneling technologies, and underground complexity create a situation that is being used by potential adversaries to reduce the U.S. strategic advantage. Fortunately, the DoD, Department of Energy (DoE), and Intelligence

Community (IC) have taken a coordinated, multi-agency approach to investing in the development of an improved HDBT defeat program. A decade of efforts from the DoD, DoE, and IC have centered on creating better ISR, weapons, and planning tools. These efforts have led to improved levels of sharing data enhancing the capability of the U.S. to find and characterize HDBTs.¹¹⁷

The Joint operational concept for HDBT defeat emphasizes the following key parameters: **find** – detect, locate, and identify existing and new HDBTs through formidable ISR to meet national strategy objectives; **characterize** – identify the HDBT mission, determine it's function and operational status, and assess the HDBT vulnerabilities; **plan** – execute deliberate and collaborative planning that allows for intelligence estimates, uncertainties, and characterizations to identify the right attack options to achieve the required target defeat; **attack** – execute the planned attack to achieve Commander's Intent; and **assess** – determine the battle damage assessment, effectiveness of the attack, update the status of the HDBT, and reattack to achieve target defeat if not accomplished.¹¹⁸ So, what is being done to defeat HDBTs?

The DoD, DoE, and IC have made substantial investments in HDBT defeat over the last 10 years. In FY09 and FY10, they invested \$565.4 and \$486.6 million respectively, across multiple programs.¹¹⁹ However, spending levels are not the best measure for evaluating the progress in the ability to hold HDBTs at risk. The best measures are the options available to physically affect the HDBTs, both lethal and non-lethal.¹²⁰ Lethal options include two broad categories: nuclear and non-nuclear weapons. For example, the Massive Ordnance Penetrator (MOP) is a non-nuclear weapon. The MOP has a significant HDBT defeat capability; however, it is limited to one

delivery platform, currently only carried on the B-2, and the total number of weapons being purchased (20).¹²¹ Proper Command and Control, and ISR capabilities are critical enablers. Holding HDBTs at risk requires the proper ISR to find, characterize, and assess potential HDBTs, and the accurate Command and Control processes, planning systems, targeting systems, communications systems, and combat assessment tools necessary to 'affect' HDBTs.

Conclusion

America's potential adversaries have realized that current non-nuclear penetrating weapons are relatively ineffective in destroying underground facilities. Therefore, potential adversaries use them to reduce the asymmetric advantage the U.S. has held for decades, and to protect their most vital national security functions and activities as well as their leadership.

The increasing numbers of strategic UGFs and improvements in their quality have outpaced U.S. technological advances to defeat them. For this reason, many adversary countries and non-state actors are investing in UGFs. In fact, more than 70 countries operate underground, and the number of strategic UGFs continues to increase. UGFs can quickly change the nature or result of a conflict and, hence, likely represent an adversary strategic COG, meaning that attacks on these COGs may deal a decisive blow to the enemy. Because UGFs can have strategic implications, they are recognized in various military strategies including the QDR, NMS-CWMD, and the CSAF Vector 2011.

Adversary strategic leaders are taking sanctuary in underground facilities. The question becomes, can these leaders be targeted? During 'approved' conflict, strategic leaders associated with the military are considered combatants and may be targeted.

The problem is outside of ‘approved’ or declared conflict. In this context, the propriety of killing terrorist leaders and leaders associated with terrorist organizations becomes a more difficult question. Unfortunately, the challenge may not be in the actual killing of strategic leaders or terrorists, but in locating, characterizing, and defeating the UGFs protecting them.

The DoD, DoE, and IC have made significant investments in HDBT defeat over the last decade. These investments include both lethal and non-lethal ways to affect HDBTs. The focus of research and development still needs to concentrate on improving penetrating weapons, but more emphasis needs to be placed on specific ISR capabilities and ‘non-penetrating’ weapons defeat technologies. Enhancements made to ISR would provide better capabilities to identify and characterize the vulnerabilities of potential HDBTs. Similarly, ‘non-penetrating’ weapon technologies offer a unique focus on improved battle damage assessment that would result from an attack on HDBTs.¹²² A better integration of data from the full spectrum of sensors and sources may identify intermittent opportunities to target the protected assets as they leave the HDBTs. In the end, HDBT’s are hard to find, characterize, and defeat, especially those protecting a state’s vital security functions and activities or a significant strategic leader. However, their strategic importance warrants national-level attention and investment because it might be the key to maintaining our military dominance and re-establishing that critical U.S. asymmetric advantage.

Endnotes

¹ Carl Von Clausewitz, *On War* (Princeton, New Jersey: Princeton University Press, 1976), 393.

² UGF and HDBT are terms often confused in literature. According to DIA's *Lexicon of Hardened Structure Definitions and Terms*, HDBT is a generic term referring to all types of adversary hardened facilities, either above or below ground. HDBTs are designed to withstand or minimize conventional [versus nuclear] weapon effects. HDBTs are divided into the following categories based on construction: Aboveground Hardened Structures and UGF. In Aboveground Hardened Structures, the roof of the structure's functional workspace is above the ground surface level; commonly referred to as bunkers. UGF is a generic term referring to all types of underground hardened facilities regardless of their depth and are divided into three classes: Shallow Underground Hardened Structures – top of roof of functional workspace is 0-20 meters below the ground surface level; Tunnels – top of the excavation of functional workspace is less than 20 meters, measured vertically from the roof to the ground surface level; and Deep Underground Hardened Structures (DUG) – top of the excavation of functional workspace is covered by 20 or more meters. This paper uses HDBT as a generic term referencing adversary hardened facilities, and UGF when referring to adversary tunnels and DUGs. Defense Intelligence Agency, *Lexicon of Hardened Structure Definitions and Terms*, Report, DI-2832-09-06, April 2006, 12.

³ LTG Ronald L. Burgess, Jr., "World Wide Threat Assessment," *Statement of Record before the Committee on Armed Services, U.S. Senate* (March 10, 2011): 16.

⁴ LTG Michael D. Maples, "Current and Projected National Security Threats to the U.S.," *Statement of Record before the Committee on Armed Services, U.S. Senate* (February 27, 2008): 31.

⁵ *Ibid*, 32.

⁶ Defense Science Board Task Force, *Future Strategic Strike Forces* (Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, February 2004), 1-8.

⁷ Non-penetrating weapons existed until June 1944. Then, the "Tallboy" was developed, a 12,000 pound, 5,200 pound warhead deep penetration weapon. The Tallboy was used for attacking tunnels and other high-priority targets. On 8 June, 1944 the first Tallboy was used in an attack against the Saumur Rail Tunnel. The Tallboy was the second biggest bomb of WWII and over 700 were used throughout the course of the war. After the Tallboy came the "Grand Slam", a 22,000 pound, 5,200 pound warhead deep penetration weapon. The Grand Slam was used for attacking viaducts, railways, and the U-boat sub pens. On 14 March, 1945 the first Grand Slam was used in an attack against the Bielefeld railway viaduct destroying two spans. The Grand Slam was the biggest bomb of WWII and 41 were used throughout the course of the war. GlobalSecurity.org, "T56 M121 10,000-lb T-39 M123 12,000-lb Tallboy T14 M110 22,000-lb Grand Slam," 2000-2011. <http://www.globalsecurity.org/military/systems/munitions/tallboy.htm> (accessed 5 December 2011).

⁸ Secretary of War, "The U.S. Strategic Bombing Survey Summary Report," September 30, 1945. <http://www.anesi.com/ussbs02.htm#c> (accessed 1 December 2011).

⁹ Center for the Study of Weapons of Mass Destruction, *Combating WMD: Challenges for the Next 10 Years* (Washington, DC: National Defense University Press, February 2005), 38.

¹⁰ Burgess, "World Wide Threat Assessment," 7.

¹¹ Ibid, 8.

¹² Ibid, 13.

¹³ Ibid, 9.

¹⁴ Ibid, 10.

¹⁵ Ibid, 4.

¹⁶ Stephen Biddle and Jeffrey A. Friedman, *The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy* (Carlisle Barracks, PA: Strategic Studies Institute, September 2008), 65.

¹⁷ Mr. Mark “Speedy” Perusse, Senior Engineer and the Targeting Weaponneering Assistance Cell’s Operations Lead, Applied Research Associates, telephone interview by author, January 5, 2012. Mr. Pete Joyce, Senior Engineer with the Targeting Weaponneering Assistance Cell, Applied Research Associates, telephone interview by author, January 5, 2012.

¹⁸ Center for the Study of Weapons of Mass Destruction, *Combating WMD: Challenges for the Next 10 Years*, 41.

¹⁹ U.S. Joint Chiefs of Staff, *Joint Operation Planning*, Joint Publication 5-0 (Washington, DC: U.S. Joint Chiefs of Staff, August 11, 2011), III-22.

²⁰ Clausewitz, *On War*, 595-596.

²¹ John A. Warden III, *The Air Campaign – Planning for Combat* (Washington, DC: National Defense University Press, 1988), 9.

²² U.S. Joint Chiefs of Staff, *Joint Operation Planning*, III-22.

²³ Warden, *The Air Campaign*, 10.

²⁴ General Richard B. Myers, USAF (RET.) with Malcolm McConnell, *Eyes on the Horizon: Serving on the Front Lines of National Security* (New York: Threshold Editions, 2009), 236.

²⁵ Robert M. Gates, *Quadrennial Defense Review* (Washington, DC: U.S. Department of Defense, February 2010), 19.

²⁶ Ibid.

²⁷ Donald H. Rumsfeld, *National Military Strategy to Combat Weapons of Mass Destruction* (Washington, DC: U.S. Department of Defense, February 2006), 10.

²⁸ Ibid, 23.

²⁹ U.S. Air Force Chief of Staff Norton A. Schwartz, “CSAF Vector 2011,” vector to update vision of U.S. Air Force to all Air Force personnel, Washington, DC, July 4, 2011.

³⁰ Ralph Bradham, *Hitler’s U-Boat Fortresses* (Westport, CT: Praeger Press, 2003), xv.

³¹ Ed Offley, *Turning the Tide: How a Small Band of Allied Sailors Defeated the U-Boats and Won the Battle of the Atlantic* (New York: Basic Books, 2011), xxiv.

³² Ibid, 392.

³³ Ibid.

³⁴ Bradham, *Hitler's U-Boat Fortresses*, 9.

³⁵ Offley, *Turning the Tide*, 5.

³⁶ Ibid, xxiii.

³⁷ Ibid.

³⁸ Bradham, *Hitler's U-Boat Fortresses*, 9.

³⁹ Ibid.

⁴⁰ Ibid, 10.

⁴¹ Ibid, 9.

⁴² Ibid, 23.

⁴³ Simon and Schuster, "Target: Germany," *Life* (November 29, 1943): 76.

⁴⁴ Ibid.

⁴⁵ Bradham, *Hitler's U-Boat Fortresses*, 12.

⁴⁶ Offley, *Turning the Tide*, xxviii.

⁴⁷ The U.S. Army Air Forces in World War II, "Bombing German Submarine Pens: October 1942-April 1945," December 7, 2010. <http://www.usaaf.net/ww2/uboats/uboatpg6.htm> (accessed 10 December 2011)

⁴⁸ Bradham, *Hitler's U-Boat Fortresses*, 29.

⁴⁹ Ibid, 10.

⁵⁰ The U.S. Army Air Forces in World War II, "Bombing German Submarine Pens: October 1942-April 1945," December 7, 2010. <http://www.usaaf.net/ww2/uboats/uboatpg6.htm> (accessed 10 December 2011).

⁵¹ Bradham, *Hitler's U-Boat Fortresses*, 55.

⁵² The U.S. Army Air Forces in World War II, "Bombing German Submarine Pens: October 1942-April 1945," December 7, 2010. <http://www.usaaf.net/ww2/uboats/uboatpg6.htm> (accessed 10 December 2011).

⁵³ Offley, *Turning the Tide*, 59.

⁵⁴ "U-Boat Fates: The guide to all U-boat losses," 1995-2011. <http://www.uboaat.net:8080/fates/losses/> (accessed 5 January 2012).

⁵⁵ Offley, *Turning the Tide*, 364.

⁵⁶ Ibid, 371.

⁵⁷ Ibid, 365.

⁵⁸ Bradham, *Hitler's U-Boat Fortresses*, xvi.

⁵⁹ The U.S. Army Air Forces in World War II, "Bombing German Submarine Pens: October 1942-April 1945," December 7, 2010. <http://www.usaaf.net/ww2/uboats/uboatspg6.htm> (accessed 10 December 2011).

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⁶³ Steven Metz, *Decisionmaking in Operation Iraqi Freedom: Removing Saddam Hussein By Force*, Strategic Studies Institute Monograph Series (Carlisle Barracks, PA: U.S. Army War College, February 2010), 2.

⁶⁴ Ibid, 5.

⁶⁵ Ibid, xii.

⁶⁶ Ibid, 6.

⁶⁷ "President's Remarks at the United Nations General Assembly," September 12, 2002, <http://georgewbush-whitehouse.archives.gov/news/releases/2002/09/20020912-1.html> (accessed 2 February 2012).

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⁶⁹ Ibid, 33.

⁷⁰ Ibid.

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⁷² Metz, *Decisionmaking in Operation Iraqi Freedom*, 14.

⁷³ James R. Woolsey, "The Iraq Connection," *Wall Street Journal*, October 18, 2001.

⁷⁴ Richard Perle, "The U.S. Must Strike at Saddam Hussein," *New York Times*, December 28, 2001.

⁷⁵ Metz, *Decisionmaking in Operation Iraqi Freedom*, 15.

⁷⁶ Ibid, 16.

⁷⁷ "The President's Radio Address," March 8, 2003, <http://www.presidency.ucsb.edu/mediaplay.php?id=25129&admin=43> (accessed 2 February 2012).

⁷⁸ "President Discusses the Future of Iraq," February 26, 2003, <http://georgewbush-whitehouse.archives.gov/news/releases/2003/02/20030226-11.html> (accessed 2 February 2012).

⁷⁹ Metz, *Decisionmaking in Operation Iraqi Freedom*, 21.

⁸⁰ Catherine Dale, *Operation Iraqi Freedom: Strategies, Approaches, Results, and Issues for Congress* (Washington, DC: U.S. Library of Congress, Congressional Research Service, April 2, 2009), 2.

⁸¹ George Tenet, *At the Center of the Storm: My Years at the CIA* (New York: Harper Collins, 2007), 304.

⁸² Mr. Michael D. Fitzgerald, Senior Defense Analyst, Plans Division CCJ5, U.S. Central Command, telephone interview by author, January 18, 2012.

⁸³ Myers with McConnell, *Eyes on the Horizon*, 235.

⁸⁴ Michael R. Gordon and General Bernard E. Trainor, *Cobra II: The Inside Story of the Invasion and Occupation of Iraq* (New York: First Vintage Books Edition, 2007), 194.

⁸⁵ Ibid.

⁸⁶ Ibid, 195.

⁸⁷ Ibid, 197.

⁸⁸ Myers with McConnell, *Eyes on the Horizon*, 240.

⁸⁹ The author participated in the Combined Weapons Effectiveness Assessment Team (CWEAT) from May-August 2003 following the formal OIF conflict. CWEAT was a U.S. Central Command directed, U.S. Central Command Air Forces led mission in partnership with the UK and Australia to collect and report weapons effectiveness information from Combined Forces Air Component Command operations during OIF, and to correlate local weapons effects to operational objectives. The author noted, and it was concluded by CWEAT, while walking the grounds of Dora Farms that there was no UGF. For more information, the entire CWEAT report can be found at: <http://www.jwac.smil.mil/JPP/Product/3706>.

⁹⁰ There are many strategic leaders inherent to a state, e.g. the king, the queen, the president, the prime minister, high ranking military leadership, etc., dependant on a particular

state structure. Specifically, this paper addresses “the” military strategic leader and his immediate staff. In considering the U.S., the strategic leadership would be the President, Vice President, Secretary of Defense, Joint Chief of Staff, and specific Service Chiefs.

⁹¹ Many terms are used to describe this approach, to include: preventive killings, active self-defense, extrajudicial killings, and interceptions. The term “targeted killing” has achieved the most acceptance and is used in this paper because it does not presume approval or disapproval of the method. This endnote was derived from: Peter M. Cullen, *The Role of Targeted Killing in the Campaign Against Terror*, Strategy Research Project (Carlisle Barracks, PA: U.S. Army War College, April 2007), 19. The definition of targeted killing is: “the intentional slaying of a specific individual or group of individuals undertaken with explicit government approval” cited from, Steven R. David, “Fatal Choices: Israel’s Policy of Targeted Killing,” *The Begin-Sadat Center for Strategic Studies: Mideast Security and Policy Studies* 51 (September 2002): 2.

⁹² There is a consensus among many scholars that approved conflicts have gained a majority vote in the UN Security Council according to the UN Charter. These conflicts are considered legal and moral, and would not result in charges brought to the International Court of Justice for waging conflict.

⁹³ *Jus in bello* explains the rules governing how wars are fought, but the more appropriate term used today is the Law of International Armed Conflict (LOIAC). The author prefers this term over *jus in bello* and will use this throughout.

⁹⁴ Mark David Maxwell, “Targeted Killing, the Law, and Terrorists: Feeling Safe?” *Joint Forces Quarterly*, no. 64 (1st quarter 2012): 124.

⁹⁵ Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict* (Cambridge: Cambridge University Press, 2004), 99.

⁹⁶ Gabriella Blum and Philip Heymann, *Law and Policy of Targeted Killing, Laws, Outlaws, and Terrorists: Lessons from the War on Terrorism* (Boston: MIT Press, forthcoming 2010), 149.

⁹⁷ Geoffrey S. Corn, “Mixing Apples and Hand Grenades: The Logical Limit of Applying Humans Rights Norms to Armed Conflict,” *Journal of International Humanitarian Legal Studies* 1 (2010): 78.

⁹⁸ Greg Travalio and John Altenburg, “Terrorism, State Responsibility, and the Use of Military Force,” *Chicago Journal of International Law* 4, no. 1 (Spring 2003): 109.

⁹⁹ Blum and Heymann, *Law and Policy of Targeted Killing, Laws, Outlaws, and Terrorists*, 10.

¹⁰⁰ Maxwell, “Targeted Killing,” 125.

¹⁰¹ *Ibid.*

¹⁰² *Ibid.*, 126.

¹⁰³ *Authorization of the Use of Military Force*, Public Law 107-40 [S. J. RES. 23], 107th Cong., 2nd sess. (September 18, 2001), 1.

¹⁰⁴ “The Obama Administration and International Law,” Annual Meeting of the American Society of International Law, March 25, 2010, <http://www.state.gov/s/l/releases/remarks/139119.htm> (accessed 20 February 2012).

¹⁰⁵ Maxwell, “Targeted Killing,” 126.

¹⁰⁶ Ibid.

¹⁰⁷ Article 51 states “Nothing in the present Charter shall impair the inherent right of individual or collective self-defense if an armed attack occurs against a Member of the United Nations, until the Security Council has taken measures necessary to maintain international peace and security. Measures taken by Members in the exercise of this right of self-defense shall be immediately reported to the Security Council and shall not in any way affect the authority and responsibility of the Security Council under the present Charter to take at any time such action as it deems necessary in order to maintain or restore international peace and security.” Michael Byers, *War Law: Understanding International Law and Armed Conflict* (New York: Grove Press, 2005), 169.

¹⁰⁸ Maxwell, “Targeted Killing,” 125. Additionally, in the *Carolina* case, “A British warship entered U.S. territory and destroyed an American steamboat, the *Caroline*. In response, U.S. Secretary of State Daniel Webster articulated the lasting acid test for anticipatory self-defense. He said, necessity of self-defense [must be] instant, overwhelming, leaving no choice of means and no moment for deliberation...[and] the necessity of self-defense, must be limited by the necessity and kept clearly within it.”

¹⁰⁹ Ibid.

¹¹⁰ Ibid, 127.

¹¹¹ As explained in the book *Obama’s Wars* by Bob Woodward, during the Bush Administration, discussions with Pakistan leadership about specific drone/weapon strikes in Pakistan were reduced from a pre-warning to as the attacks were happening. This was done to prevent, what was suspected, Pakistan intelligence from alerting the terrorists to upcoming U.S. attacks. Bob Woodward, *Obama’s Wars* (New York: Simon & Schuster, 2010), 4.

¹¹² Greg Miller, “U.S. Spy Agencies See New Iran Risk,” *Washington Post*, February 1, 2012.

¹¹³ Ibid.

¹¹⁴ Mr. Joe Renick, Chief Scientist with the Targeting Weaponizing Assistance Cell, Applied Research Associates, telephone interview by author, November 30, 2011.

¹¹⁵ Many adversaries produce at least a basic GPS jamming capability. The adversary usually places GPS jammers around high value targets to confuse the signal between the GPS satellite and the weapon flying to the target. The signal confusion increases the miss distance between the weapon and the target minimizing the weapon’s effects on the target.

¹¹⁶ Mr. Randy “Maddog” Long, Senior Scientist and Targeting Weaponizing Assistance Cell’s Project Manager, Applied Research Associates, in person interview by author, January

15, 2012. Mr. Bruce “Buster” Brown, Senior Engineer with the Targeting Weaponneering Assistance Cell, Applied Research Associates, in person interview by author, January 15, 2012.

¹¹⁷ Mr. Tom Lutton, Chief Target Assessment Technical Division, Hard Target Research and Analysis Center and the Underground Facilities Analysis Center, in person interview by author, August 15, 2011.

¹¹⁸ The Secretary of Defense in conjunction with The Secretary of Energy, The Director of National Intelligence, *Report to Congress on the Defeat of Hard and Deeply Buried Targets* (Washington, DC: U.S. Department of Defense and Energy, 1 July 2001), 13.

¹¹⁹ Dr. Robert Hastie, Chief Hard Target Defeat Branch, Defense Threat Reduction Agency, in person interview by author, August 15, 2011.

¹²⁰ This paper does not address non-lethal options. For more information on non-lethal capabilities against HDBTs, reference the classified document: The Secretary of Defense, The Secretary of Energy, (S) The Director of National Intelligence, *2011 Report to Congress on Weapons and Capabilities to Defeat Hardened and Deeply Buried Targets* (Washington, DC: U.S. Department of Defense, Energy, and Office and National Intelligence, 1 July 2011).

¹²¹ Long, Senior Scientist, in person interview by author, January 15, 2012.

¹²² For more information on “non-penetrating” weapon technologies against HDBTs, reference the classified document: The Secretary of Defense, The Secretary of Energy, (S) The Director of National Intelligence, *2011 Report to Congress on Weapons and Capabilities to Defeat Hardened and Deeply Buried Targets* (Washington, DC: U.S. Department of Defense, Energy, and Office and National Intelligence, 1 July 2011).

